Depleted Uranium Training for Medical Care Providers

Terminal Learning Objective

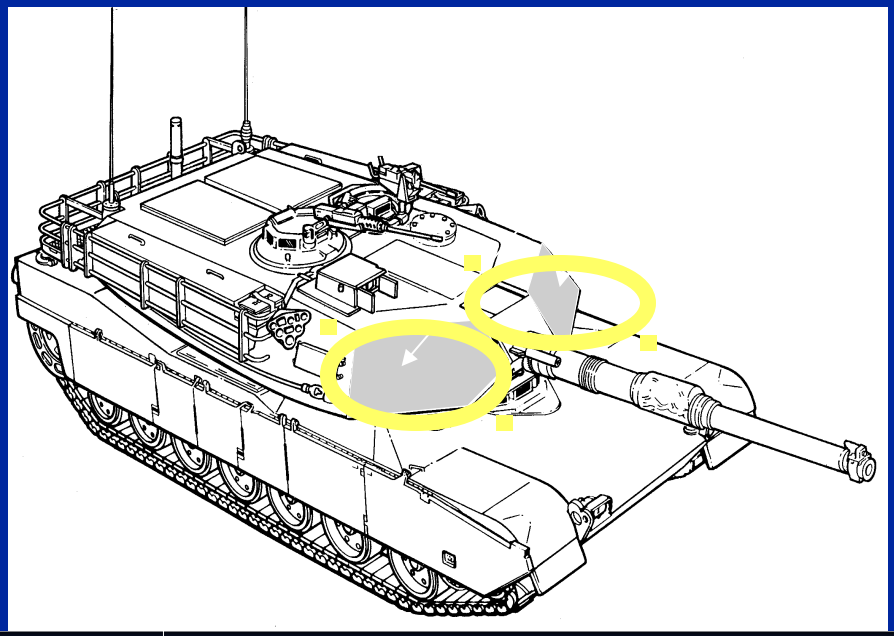
- **Given a scenario, describe the policy for treatment of DU wounds IAW the HQDA policy memo of April, 1999.**

Enabling Learning Objectives

- Identify the characteristics of depleted uranium.
- Identify medical responses to DU wounds.
- Identify the appropriate laboratory tests for follow-up to DU wounds.

General Military Uses

- Armor penetrating munitions
- Armor plate



Properties and Characteristics

- **Depleted Uranium (DU) is a metal that is a by-product of the uranium enrichment process.**
- **DU is 40% less radioactive than natural uranium.**
- **Self-sharpening.**

Difference Between DU and Tungsten Penetrators

Characteristics

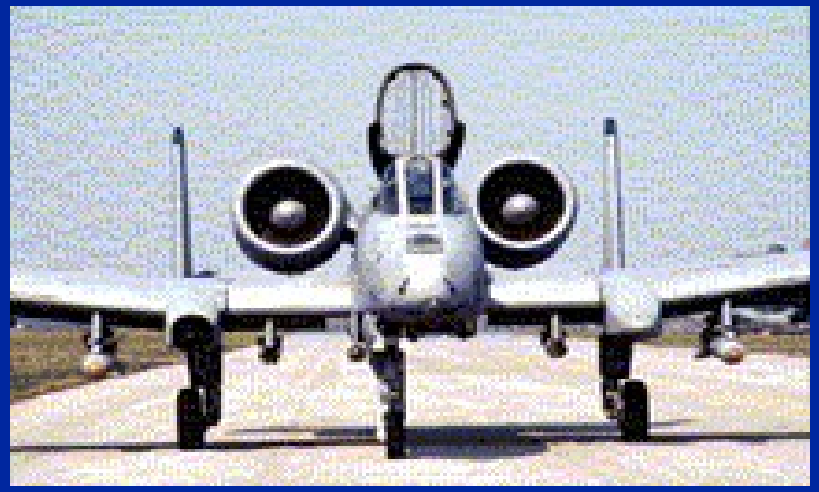
- Pyrophoric
- Heavy metal
- Less radioactive than natural U
- Chemically identical to uranium
- Extremely dense
- Dull black

US Weapons Systems

Bradley Fighting Vehicle

Abrams Tank

US Weapons Systems



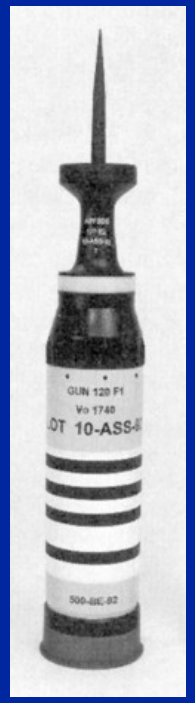
Air Force A-10

Marines AV-8

Depleted Uranium Munitions

Foreign Countries DU Munitions

British
RO CHARM 3 DU



French
OFL 120 E2

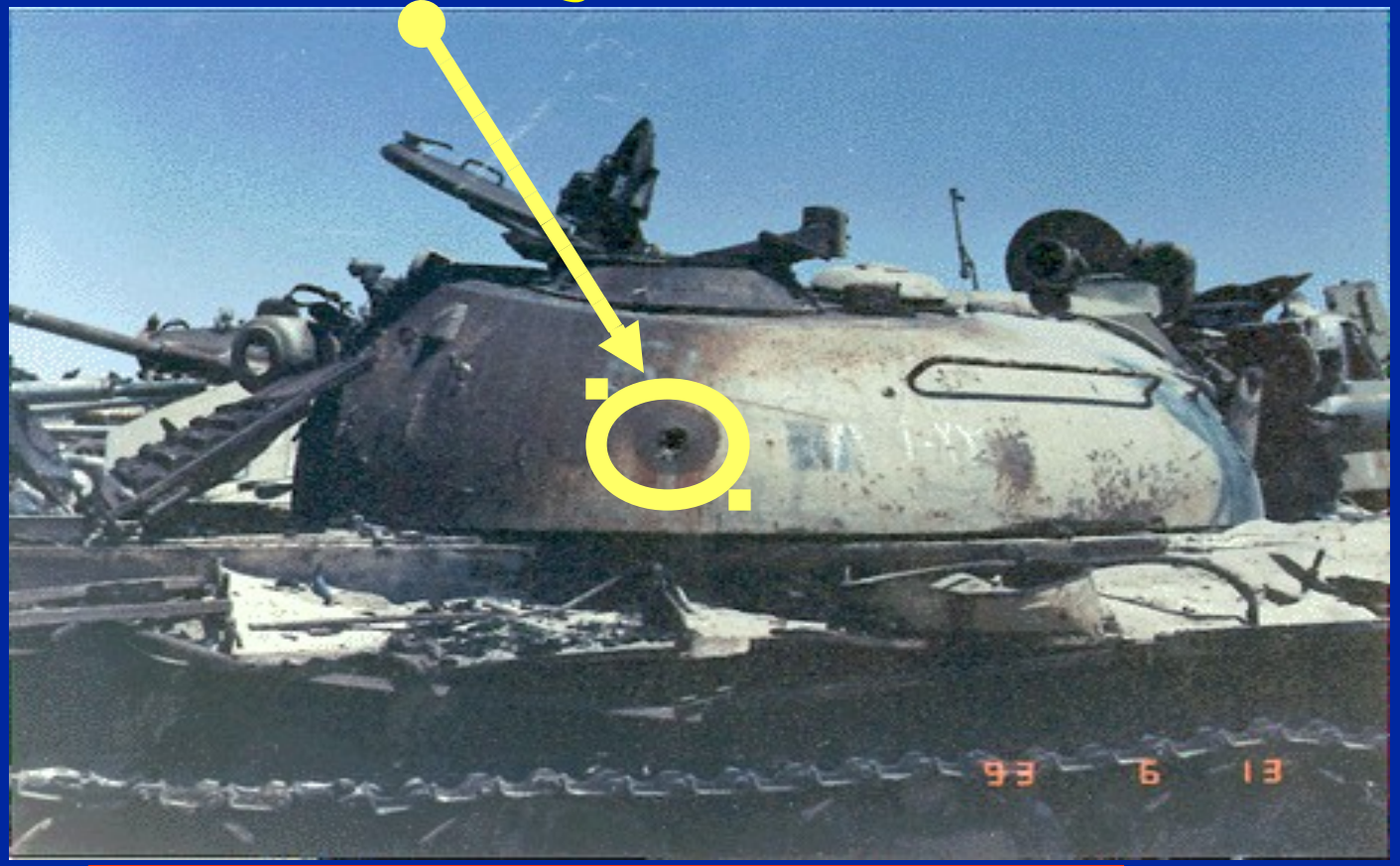
Russian
3BM32

Visual Indicators of Depleted Uranium

- Small entry and exit holes
- Penetrators present
- Dull black dust (oxide)

Positive RADIAC Meter Indication Provides Positive ID

Small Entry and Exit Holes



Iraqi tank hit by DU

DU Exposure

- External hazard – low-level radiological
- Internal hazard - toxicant

Externally, DU poses very little exposure risk, because:

- **Alpha <u>particles</u> cannot penetrate skin and travel less than two inches**
- **Beta <u>particles</u> are blocked by BDUs, boots, etc.**
- **Gamma <u>rays</u> from DU are very weak**

External hazard from DU

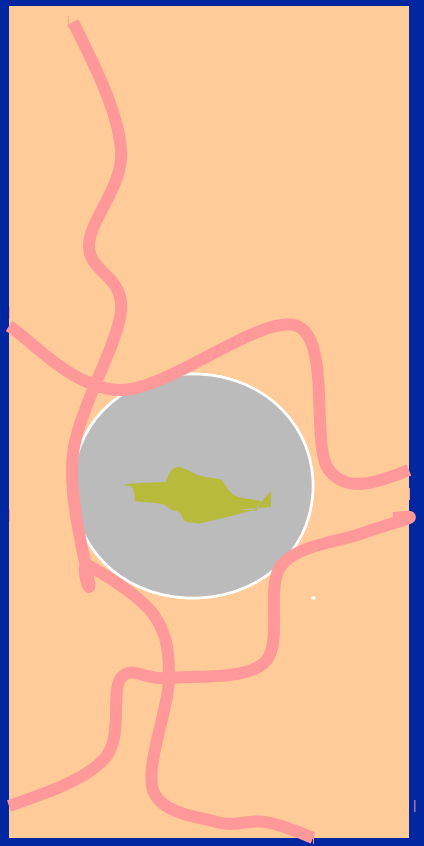
- Soldiers handling DU, or riding in armor vehicles receive very low radiation exposure.
  - Exposures exceeding occupational limits are not possible
  - Exposures exceeding limits for members of the general public are possible, but not likely

PNNL Report – Soldier Exposure

- Soldier in fully loaded armor vehicle below 25% of annual occupational radiation dose limit
- Skin dose limit only exceeded for direct contact >250 hours
- Worse-case internal <20% annual limit

Internal hazard from DU

- Similar to lead
- Fragments dissolve slowly
- Blood – systemic
- Excreted in urine



Could exceed chemical toxicity safety standards if:

- In or near armored vehicle when hit by DU
- In or near DU armored vehicle when struck by DU or conventional munitions
- Long periods inside DU-contaminated vehicle w/o personal protection

RADCON personnel atop burned-out M1A1, Camp Doha, 1991

Rand Corporation Report

- No report of negative health effects in veterans
- Normal environmental exposure not associated with negative health effects
- Radiation below level of concern
- Effects from fragments depend on size and location
- Heavy metal exposure can cause kidney problems (not seen in Gulf War DU vets)

Indicators of DU Casualty

- Vehicle struck by kinetic energy munition
- Vehicle struck by friendly fire
- Eyewitness report of burning fragments
- Field Medical Card
- X-ray images
- Radiation measurements

Medical Response

- Never delay treatment to assess DU
- Medical personnel not at risk from contaminated patient
- First aid no different than conventional wounds - SMCT
- Unless medically contraindicated, remove 1cm and larger fragments

Policy for Medical Treatment

- Standard procedures for debridement
- Standard (universal) precautions adequate
- Do not delay for radiological monitoring
- Looks like steel or lead on X-rays
- Remove fragments using standard procedures
- Monitor kidney function

❖***Care-givers are not at risk***

Laboratory Tests

- **Standard renal function tests: Serum BUN, creatinine, beta-2 microglobulin, creatinine clearance.**

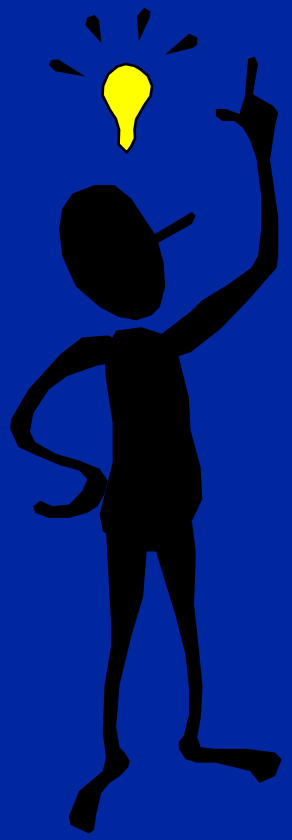
➢ **Uranium bioassay.**

Uranium Bioassay

- Initial void
- Baseline
- Initial 24-hour
- 7 –10 day follow-up
- Subsequent sampling

Assistance

- **USACHPPM**
- **USAMEDCOM Clinical Services Division**
- **USAMEDCOM Radiation Safety Staff Officer**



Main Points

- DU Characteristics
- DU Treatment
- Lab Tests

Questions ? ? ?
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